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REPUBLIC Bild-A-Flex

CONSTRUCTION ANGLES

Imagineering in Steel

Convert Ideas for...

Saving Space and Time

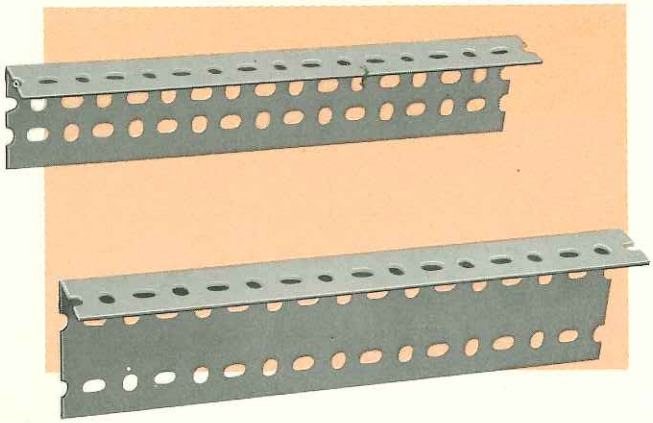
into...

Money Saving Equipment

Republic Steel Corporation Berger Division Canton 5, O.

REPUBLIC **Bild-A-Flex** CONSTRUCTION ANGLES

make it easy to..

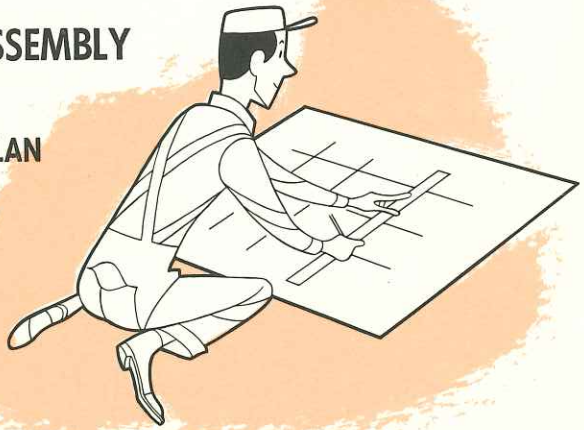


Republic Bild-a-Flex makes every man an engineer. This new construction angle makes it easy for you to "imagineer." Your own imagination is the only limit to the applications of Bild-a-Flex. Versatile, it is as easy to assemble as a child's construction set. Rugged, Bild-a-Flex is made of heavy gauge steel, bonderized after fabrication. Bild-a-Flex is finished in gray baked-on enamel. Engineered, Bild-a-Flex has a scientifically designed pattern of slots for easy erection. It comes in convenient, useable lengths. You save time, space and money with Bild-a-Flex, another in the long list of Republic-Berger products.

ONLY 3 STEPS FROM IDEA TO ASSEMBLY

PLAN

You don't need a blueprint or engineer's drawing to build with Bild-a-Flex. Your own simple line sketch with dimensions is all that is needed. You can convert your "imagineered" idea into equipment quickly, efficiently, professionally.



CUT

Easy-to-read cutting marks at three-inch intervals make it easy to tailor Bild-a-Flex to your needs. The cutting operation is simple with the Bild-a-Flex cutter. For added ease in handling, Bild-a-Flex comes in convenient 10 and 12 foot lengths.

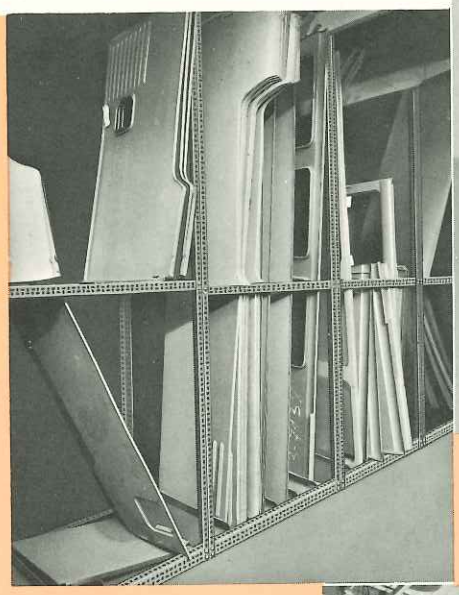
JOIN

Assembly is so simple with Bild-a-Flex. It's almost fun to bring your plan to reality. Bild-a-Flex self-locking nuts and bolts and a standard wrench are all that you need.

Imagineer in Steel

Decide – then Build

1. storage racks
2. work benches
3. framing for mezzanines
4. sheet metal racks
5. shipping tables
6. stock carts
7. machine stands
8. framing for catwalks
9. machine guards
10. ramps and ladders
11. scaffolding
12. work platforms
13. pallet racks
14. small buildings
15. framing for partitions and enclosures
16. support framing for conveyors
17. framing for electrical control systems
18. framing for the suspension of pipes and ducts
19. jig holders and tables
20. long parts storage racks

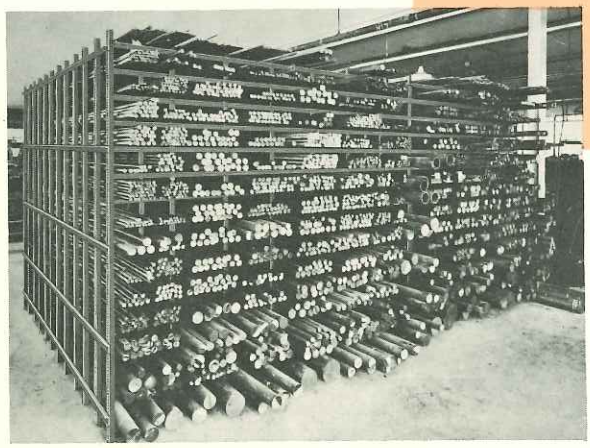


Safe, economical platform ladder put together quickly with Bild-a-Flex.

Odd sized material stored in Bild-a-Flex framing saves space.

Add square feet to your plant with double decked storage areas and mezzanines of Bild-a-Flex.

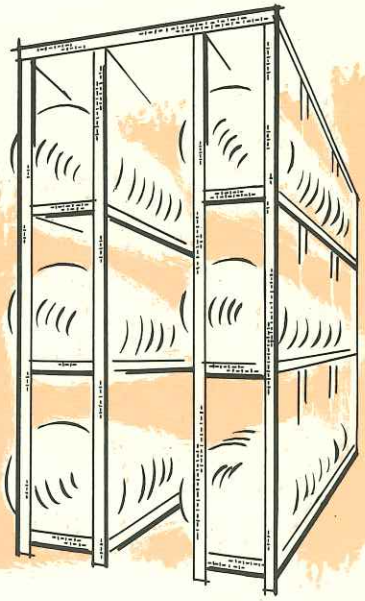
Sturdy pallet rack economically made with Bild-a-Flex.



Handling efficiency and inventory control result with long parts storage racks of Bild-a-Flex.

Only *Your Imagineering* Limits the

Space saving applications such as this Bild-a-Flex mezzanine converts normally wasted space into efficient plant area.



Practical, efficient work tables are easily made to suit your specific needs, with versatile Bild-a-Flex.

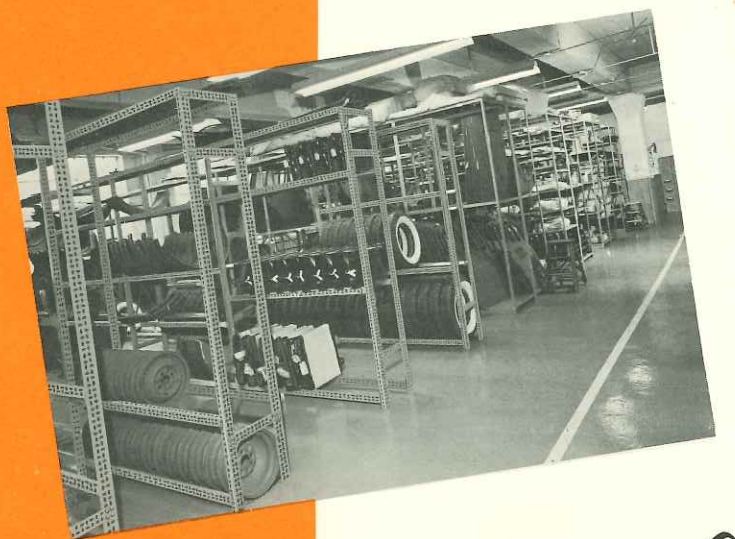
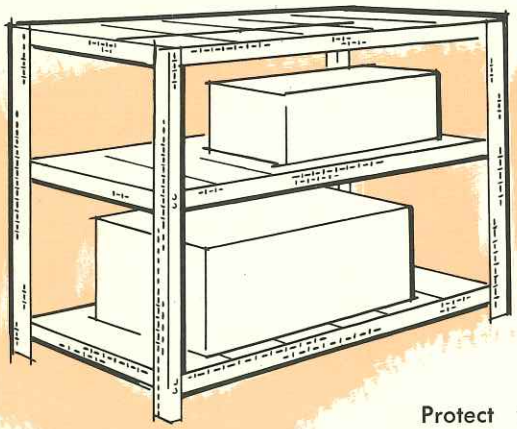


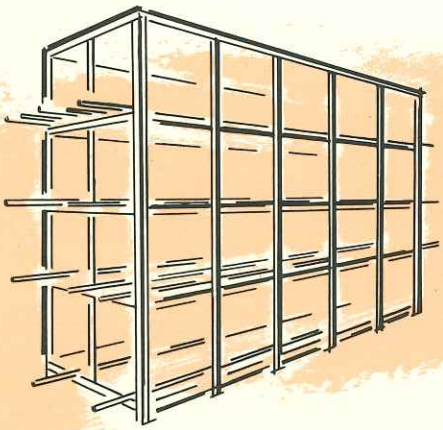
Bild-a-Flex tire and wheel rack provides an easy solution to a tough storage problem.

Save Time-Space

Uses for Republic Bild-A-Flex

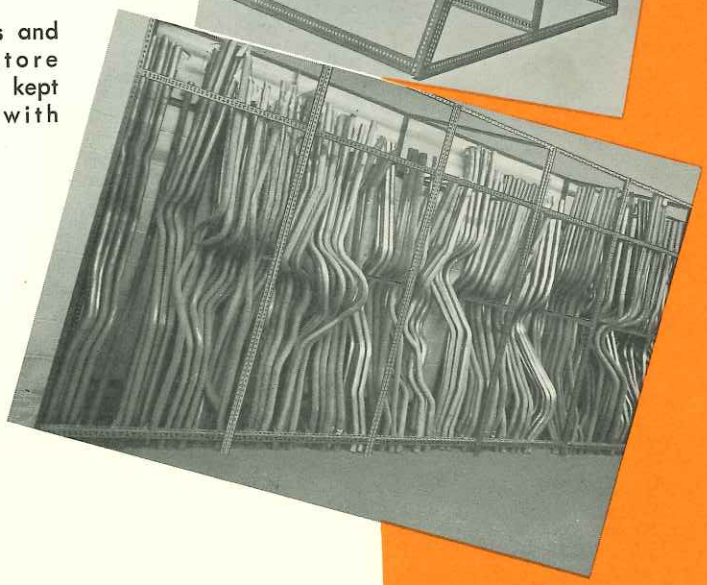


Protect valuable inventories with partitions framed with Bild-a-Flex angles.



Vertical storage of long parts in "A" frames of Bild-a-Flex saves time and space.

Odd shapes and hard-to-store lengths are kept in order with Bild-a-Flex.



and Money...with versatile Bild-A-Flex

Bild-A-Flex CONSTRUCTION ANGLES

. . . the Logical Answer to High Space and Equipment Costs

ECONOMICAL

Republic Bild-a-Flex gives you the economies of wide application, re-usability, and big savings in time and space. The added economy of controlled quality at the lowest possible price is guaranteed by Republic Steel, third largest steel producer in the world.

CONVENIENT

Your own storeroom can hold the answers for day to day framing problems. Bild-a-Flex is easy to store. The space used by a ten-foot length of two-by-four will accommodate 100 feet of Bild-a-Flex. Keep a stock on hand to translate your "imagineering" into immediate action.

ADAPTABLE

Even complicated framing problems are easy prey for Bild-a-Flex. Its unique system of short longitudinal and transverse slots makes possible an unlimited number of straight and angular assembly combinations. Framing problems almost solve themselves with Bild-a-Flex.

FLEXIBLE

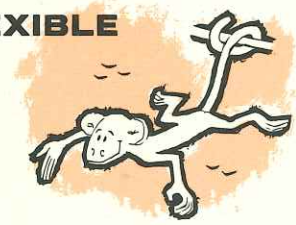


Bild-a-Flex gives your "imagineering" complete flexibility. With slots arranged on ¾" centers, your structure can be built to the dimensions you choose. Bild-a-Flex is designed to fit. It is a product you can tailor to your needs.

RUGGED

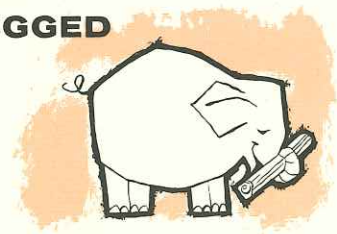


Bild-a-Flex is fabricated from heavy gauge steel to give maximum strength and rigidity. A single section in either of the two gauges offered, will be adequate for most requirements. Where greater strength is needed, compound sections can be developed quickly and at low cost.

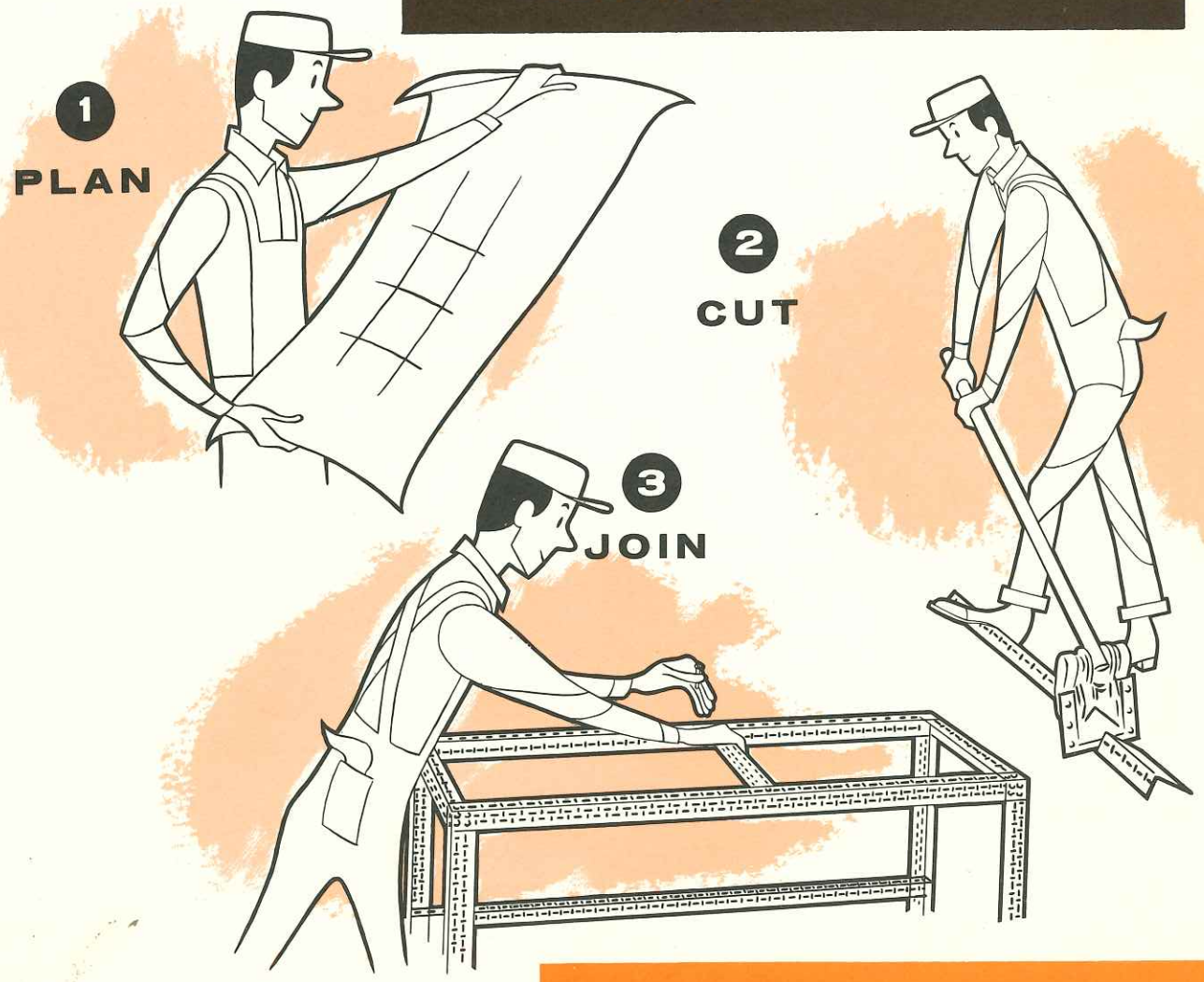
PRACTICAL

Bild-a-Flex is never obsolete. Its cut-and-join simplicity makes quick assembly possible with unskilled labor. When one setup is no longer needed, it can be torn down, and the components can be turned into a new and useful unit. There is no scrap loss. Even the smallest piece of Bild-a-Flex can be used as a cleat or splice.

Build Anything with an Idea and

REPUBLIC Bild-A-Flex

CONSTRUCTION ANGLES



REPUBLIC STEEL CORPORATIO
BERGER DIVISION • CANTON 5, OHIO

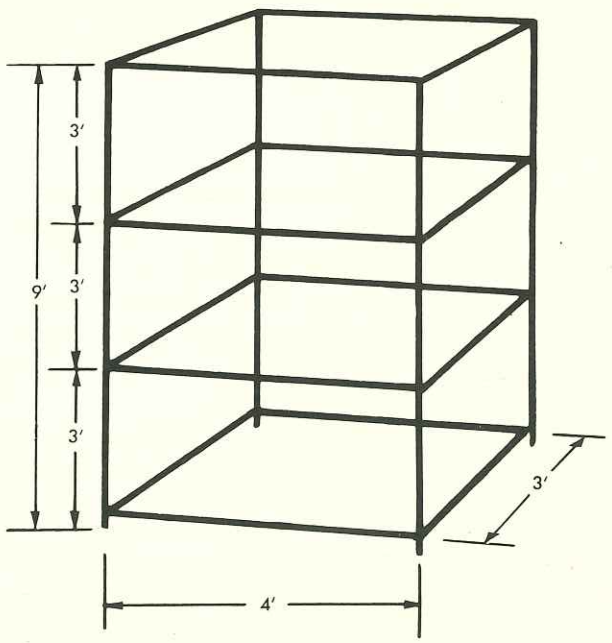
The PLAN

An idea, like any good tool, is only good when it is put to use. Outlined on the following pages is a simple procedure for maturing your "imagineering" into practicality. Carefully followed it is your assurance of an efficient and economical Bild-a-Flex installation.

Republic Bild-a-Flex is designed so that there are just three steps from idea to joining into the finished structure. No complicated blueprint is required—only a simple dimensioned line sketch. The unique Bild-a-Flex arrangement of longitudinal and transverse slots coupled with the angle shape is easily adapted to the original idea.

Reference to the Bild-a-Flex load charts on pages 12, 13, 14 and 15, allows you to quickly calculate desired load bearing qualities. When this is accomplished you are ready to select the proper Bild-a-Flex sections to meet your specific requirements. After all dimensions and other pertinent information has been transferred to the work sketch you have a complete cutting and assembly diagram. Bild-a-Flex is ready to go to work for you.

As framing possibilities and money saving ideas occur to you put them down on paper. Then translate them into a simple line sketch such as the one illustrated on the right. Complete it by adding all applicable dimensions such as width, depth, height and distance between load supporting beams. Estimate the weight that is to be supported and then refer to the Bild-a-Flex load tables and make the easy load calculation described on pages 10 and 11. Select the proper load section to meet your framing requirements.



This illustration is typical of the simple line drawing that is required to start your idea on its way to practical maturity.

Planning the Job

Plan the connections of your Republic Bild-a-Flex installation for maximum strength by joining two long legs wherever possible. This provides the largest common surface between components and permits a greater number of bolts to be used. When required diagonal bracing can be used to increase joint strength and rigidity.

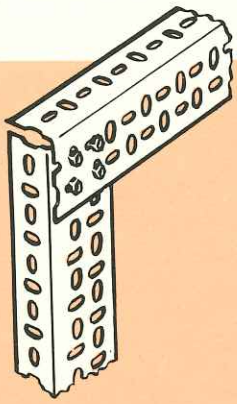
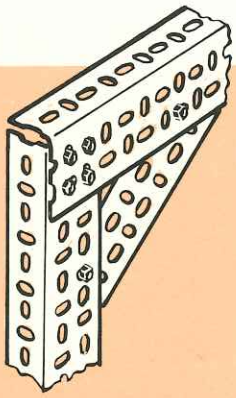
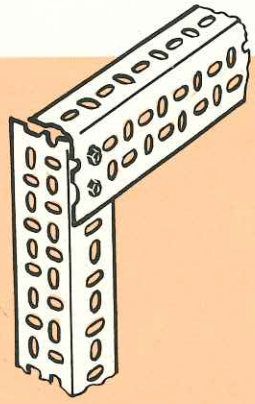


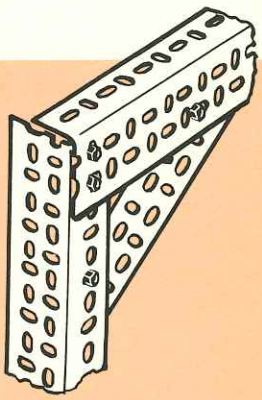
Bild-a-Flex connection assures maximum rigidity by joining two long legs.



Diagonal bracing gives Bild-a-Flex long leg connection increased rigidity.



Long and short leg Bild-a-Flex connection assures strength and rigidity second only to that of joining two long legs.

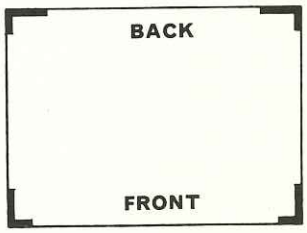


The long and short leg connection can be made more rigid through use of a diagonal brace.

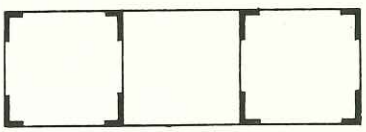
Republic Bild-a-Flex, when used as a conventional beam section supported at both ends, develops its greatest rigidity with the long leg of the angle down. But when used as a cantilever beam supported at one end only it is stronger with the long leg up.

Bild-a-Flex columns are stronger if, whenever possible, beams are planned to run in both directions from the column.

When using Bild-a-Flex Construction Angles as columns (uprights) the legs of the angles may be used in either direction. For best results, however, Bild-a-Flex columns should be assembled as in the single and multiple units illustrated.

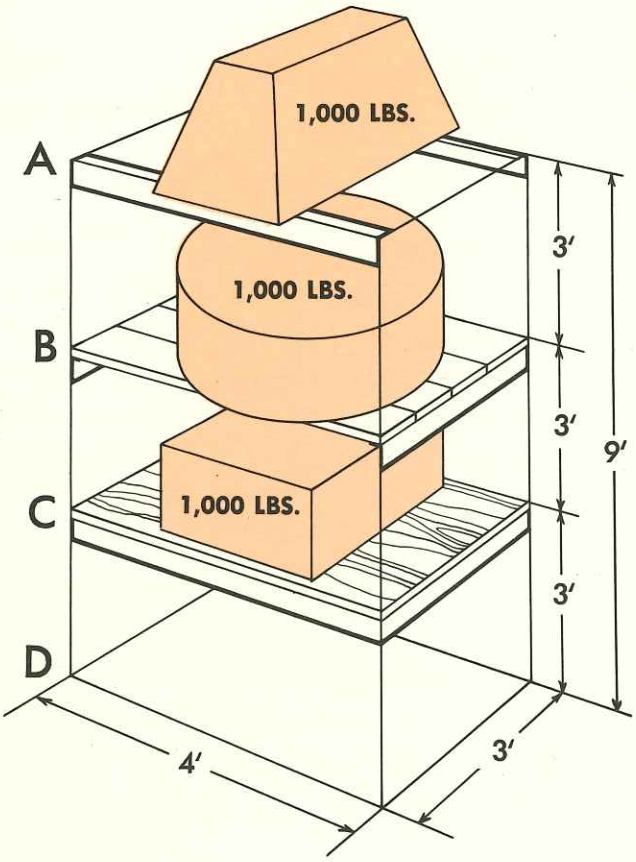


This single unit Bild-a-Flex Column arrangement is planned for maximum rigidity and the largest possible front opening.



Multiple unit Bild-a-Flex Column arrangement showing the strongest alignment with angles facing each other in alternate bays.

Calculating the



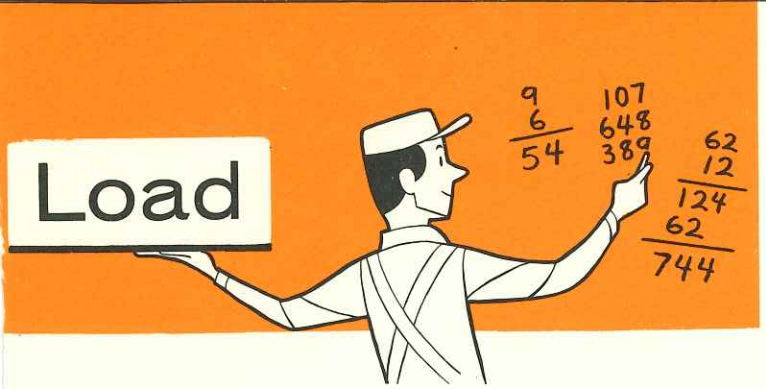
After sketching the general outline of your idea you next determine the proper sections of Bild-a-Flex to support the anticipated load. This can be done quickly and easily by carefully observing the following procedure.

For purposes of illustration assume that you are building the rack shown here. This structure encompasses the three most common loading conditions. Areas A, B and C each support 1000 pounds of distributed load. Area D need not be considered because it rests on floor.

Load A is supported by two 4-foot beam sections. Refer to the Bild-a-Flex Beam Load Chart on page 12 to find the proper section to accommodate the 1000 pound load. By checking under 4-foot beams you find that the single angle section indicated on line 3 will support 1170 pounds and is the section needed to support load A.

Standard Bild-a-Flex Panels support Load B. Under these conditions the 1000 pound load is transmitted to the panel ends and these are supported by a pair of 3-foot beams. Referring to the Beam Load Chart on page 12, under 3-foot beams you find that the single angle section shown on line 3 will carry 1690 pounds and will handle Load B safely.

To decide on the number of Bild-a-Flex Panels required to support the load refer to the Panel Load Chart on page 15. In this instance you find that a 48 inch wide panel will support 195 pounds. Divide this weight into Load B and you have the number of panels required to carry the 1000 pounds.



When you must determine the maximum loading available for a surface of more than one Bild-a-Flex Panel multiply the number of panels by the chart load shown on page 13. This will give you the correct maximum loading.

Load C is supported by a solid surface that rests on four Bild-a-Flex Beams and distributes the 1000 pounds equally among them. The two 3-foot and two 4-foot beams equal a combined total of 14 feet of suppor-ing beam length. You obtain a 72 pound per foot load by dividing 14 into the load total. For the purpose of determining the proper Bild-a-Flex section to use, all calculations are made on the four foot span which is the longer, thus weaker, beam. The two 4-foot beams total 8 feet. Multiply this figure by the 72 pounds per foot load and you have the total weight of 576 pounds supported by both beams, i.e.,

2 beams $\times$ 4 ft. span = 8 ft. $\times$ 72 lbs./ft. = 576 lbs. total weight.

Now by reference to the Beam Load Chart on page 12 you find that a 4-foot beam of single angle section indicated on line 3 will support 1170 pounds and is adequate for our load requirements. It is safe to assume that the 3-foot beams are capable of supporting the load because they are shorter and stronger.

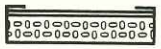
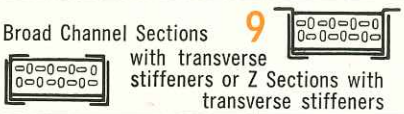
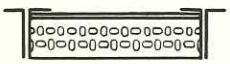
Similarly, to obtain the right Bild-a-Flex column section to meet your requirements the column load must be calculated. To continue with the same load problem all the load areas are supported equally by the 4 columns. This allows you to base your calculation on a single column section. The load for column section AB is one-fourth of Load A and equals 250 pounds. Column section BC supports one-fourth of Load B (250 pounds) plus the load supported by AB or a total of 500 pounds. And section CD carries one-fourth of Load C (250 pounds) plus the 500 pound load on section BC, or a total of 750 pounds.

Column loads are based on free and unbraced columns lengths. And because Column sections AB, BC and CD are each 3 feet long you are able to determine that the load requirement is for a 3-foot section that will bear 750 pounds safely. A reference to the Column Load Chart on page 13, line 1, indicates that a free and unbraced column 3 feet long in a single angle section will support 2540 pounds and meet the necessary requirements.

You can "imagineer" all of your ideas into everyday practicality with Bild-a-Flex simply by following the outlined procedure and carefully making the easy calculations.

LOAD TABLES • Table A

Bild-A-Flex Beams (Horizontals) .080 guage

BEAM SECTION	BEAM LENGTH								
	2′	3′	4′	5′	6′	7′	8′	9′	10′
1 Single pieces of slotted angle (long legs up)		750	500	370					
2 Single pieces of slotted angle (short legs down)		910	600	400	230	170			
3 Single pieces of slotted angle (long legs down)		1690	1170	880	670	530	380	250	
4 Single pieces of slotted angle (long legs down) with transverse stiffeners 		2070	1410	1070	900	710	600	460	370
5 Narrow Channel Sections (see figure B, page 13)		2330	1900	1610	1380	1200	1010	900	750
6 Z Sections (see figure E, page 13)	4720	2760	1970	1460	1080	780	600	460	350
7 Broad Channel Sections (see figure C, page 13)	4750	3300	2350	1760	1420	1140	900	700	540
8 Broad Channel Sections with transverse stiffeners or Z Sections with transverse stiffeners 9 		3830	2670	2080	1780	1570	1400	1280	1130
10 T Sections (see figure D, page 13)	6350	4000	3100	2450	1870	1480	1170	930	750
11 T Sections with transverse stiffeners 		4020	3120	2420	1890	1500	1200	960	770
12 Nested Sections (see figure A, page 13)		5400	4210	3300	2800	2410	2070	1800	1570
13 I Sections (see figure F, page 13)		7000	5050	3820	3200	2800	2460	2210	2020

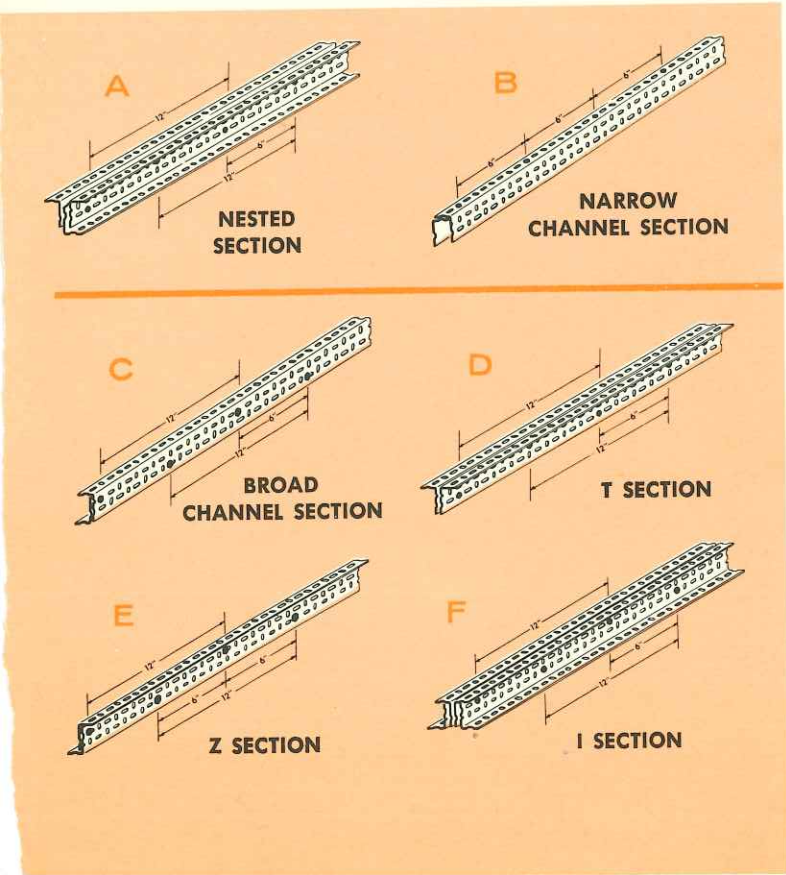
The figures given are for evenly distributed loads. To determine capacities for concentrated loads divide by 2. *Do not exceed these figures.*

LOAD TABLES • Table B

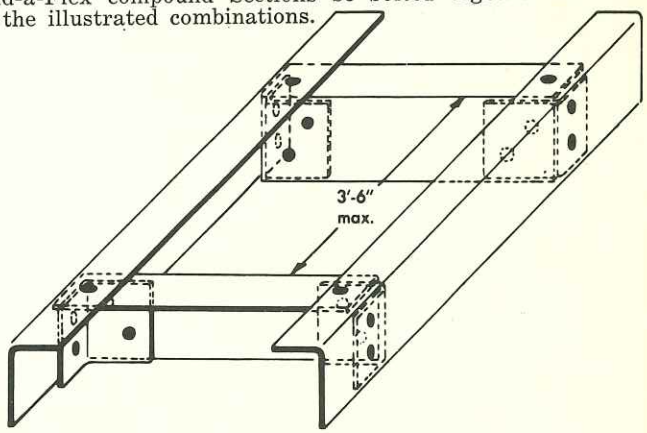
Bild-A-Flex Columns (Uprights) .080 gauge

COLUMN SECTION	COLUMN LENGTH 3′	4′	5′	6′	7′	8′	9′	10′
1 Single piece of slotted angle	2540	2190	1690	1190	740			
2 T Section (see figure D) 3 Broad Channel Section (see figure C) 4 Narrow Channel Section (see figure B)	5290	4990	4440	3490	2600	1940		
5 T Section 6 Channel Section	5490	5200	4790	4300	3740	3000	2290	1790
7 8 T-Channel Sections 9	8080	7690	7080	6490	5480	4280	3190	2290
10 I Section (see figure F)	10580	9970	8880	6980	5180	3890		
11 I Section	10960	10370	9580	8570	7490	5960	4570	3570

The figures given are for evenly distributed loads. To determine capacities for concentrated loads divide by 2. *Do not exceed these figures.*



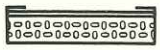
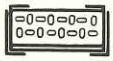
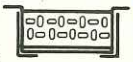
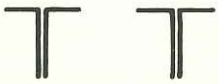
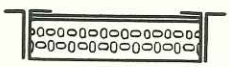
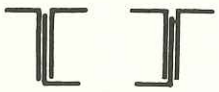
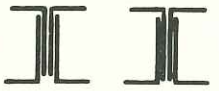
Where greater strength is required we recommend that Bild-a-Flex compound Sections be bolted together as in the illustrated combinations.



When supporting concentrated loads the capacity of a pair of beams can be increased by the addition of transverse stiffeners. These should be placed immediately under the load bearing point. Beams that are six feet long or less require only one stiffener in the center of the span. Seven foot beams need two stiffeners placed two feet from each end and eight foot beams require two stiffeners two feet, six inches from the ends. For beams with a nine foot span it is necessary to have three stiffeners at two foot, three inch intervals. Ten foot beams also need three stiffeners with two foot, six inch spacings. Transverse stiffeners should never be spaced more than 3 feet 6 inches apart.

LOAD TABLES • Table C

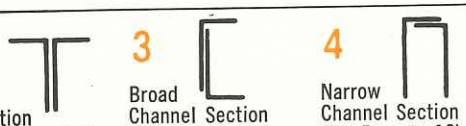
Bild-A-Flex Beams (Horizontals) .104 guage

BEAM SECTION	BEAM LENGTH								
	2′	3′	4′	5′	6′	7′	8′	9′	10′
1 Single pieces of slotted angle (long legs up)		1140	850	690					
2 Single pieces of slotted angle (short legs down)		1250	850	600	400				
3 Single pieces of slotted angle (long legs down)	4800	2750	1800	1280	1000	790	610		
4 Single pieces of slotted angle (long legs down) with transverse stiffeners 		3900	2690	2050	1700	1480	1280	1100	960
5 Narrow Channel Sections (see figure B, page 13)		4160	3560	3130	2750	2400	2170	1950	1780
6 Z Sections (see figure E, page 13)	8180	5000	3650	2750	2200	1750	1350	1020	700
7 Broad Channel Sections (see figure C, page 13)	10600	6050	4440	3330	2670	2120	1660	1210	1000
8 Broad Channel Sections  9  with transverse stiffeners or Z Sections with transverse stiffeners		6100	4620	3670	3110	2680	2380	2100	1950
10 T Sections (see figure D, page 13) 	13700	7800	5900	4600	3800	3190	2630	2170	1810
11 T Sections with transverse stiffeners 		7900	6300	5050	4070	3240	2630	2170	1810
12 Nested Sections (see figure A, page 13) 		10050	8000	6320	5350	4650	4040	3520	3120
13 I Sections (see figure F, page 13) 		12700	9550	7540	6540	5730	5030	4520	4000

The figures given are for evenly distributed loads. To determine capacities for concentrated loads divide by 2. *Do not exceed these figures.*

LOAD TABLES • Table D

Bild-A-Flex Columns (Uprights) .104 gauge

COLUMN SECTION	COLUMN LENGTH							
	3′	4′	5′	6′	7′	8′	9′	10′
1 Single piece of slotted angle	3470	2870	1970	1280				
2 T Section (fig. D, page 13) 3 Broad Channel Section (fig. C, page 13) 4 Narrow Channel Section (fig. B, page 13) 	7970	7360	6570	5270	3670	2580		
5 T Section 6 Channel Section	8770	8580	8180	7690	6970	6260	5460	4460
7 8 T-Channel Sections 9	12560	11970	11360	10480	9470	8370	6880	5370
10 I Section (fig. F, page 13)	15940	14750	13160	10560	7370	5170		
11 I Section	17550	17150	16360	15360	13970	12570	10970	8960

The figures given are for evenly distributed loads. To determine capacities for concentrated loads divide by 2. *Do not exceed these figures.*

Bild-A-Flex Shelf Panels

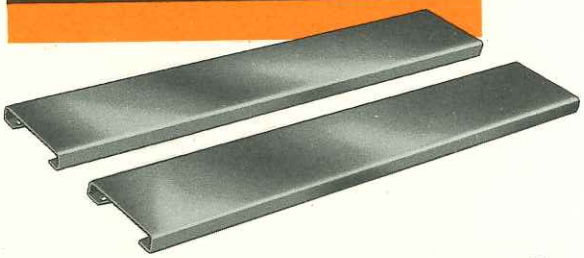


Bild-a-Flex Shelf Panels are designed to provide a strong rigid, and easily applied loading surface. They afford many practical, versatile applications, a few of which are shelving, bench tops, carts, bins and stair treads.

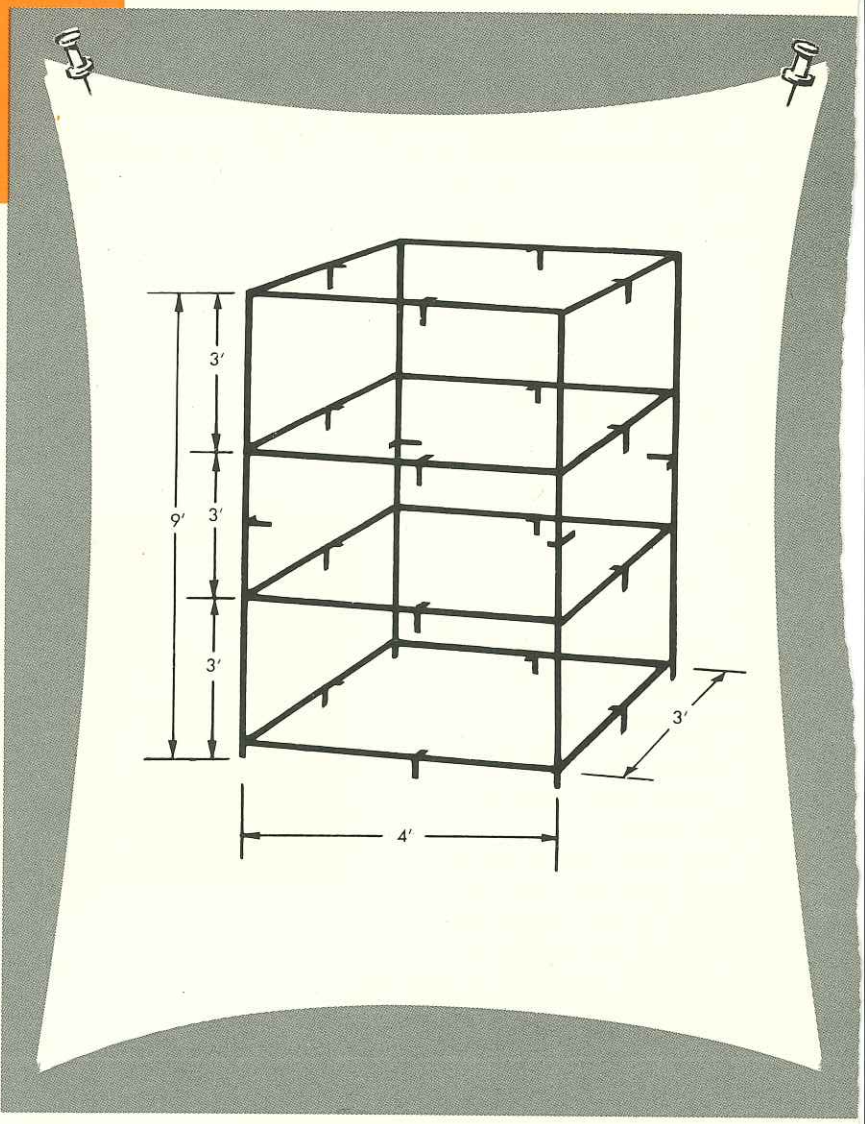
Bild-a-Flex Shelf Panels are fabricated of .030 gauge steel for light loads and .050 gauge for heavy duty. They are available in six inch widths and range in length from 36 inches to 60 inches in six inch increments. Bonderized and finished in No. 50 gray baked-on enamel for durability and appearance, Bild-a-Flex Shelf Panels make perfect partners for any Bild-a-Flex structure.

LOAD TABLES

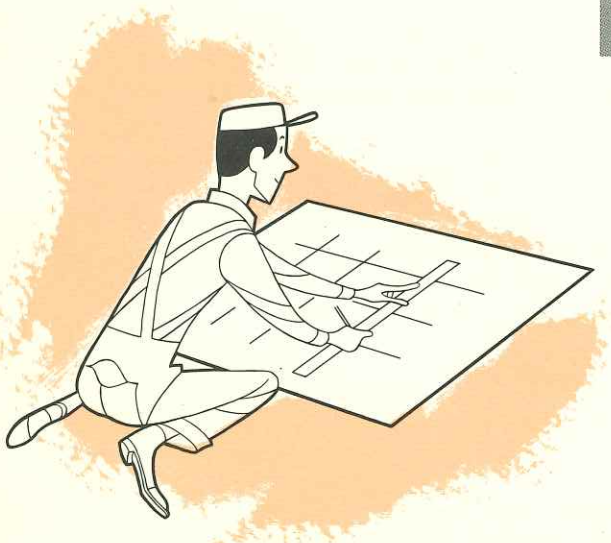
Panel		Light Duty .030 guage	Heavy Duty .050 guage
1	6″ x 36″	240 lbs.	595 lbs.
2	6″ x 42″	215 lbs.	405 lbs.
3	6″ x 48″	195 lbs.	350 lbs.
4	6″ x 54″	170 lbs.	315 lbs.
5	6″ x 60″	155 lbs.	270 lbs.

The figures given are for evenly distributed loads.
Do not exceed these figures.

The Final PLAN



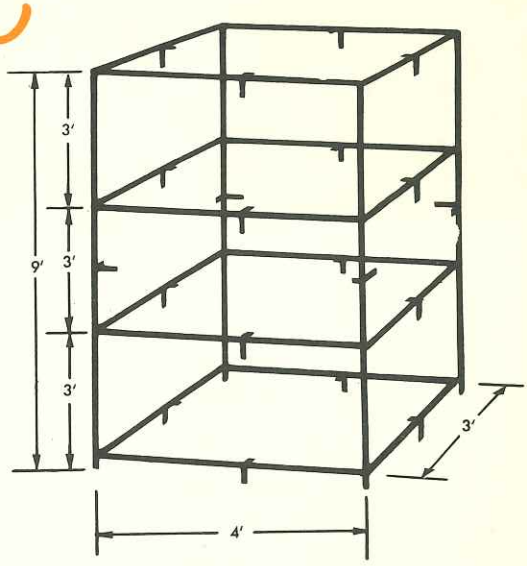
You now have both a cutting diagram and an erection drawing if your sketch resembles the illustration. It includes the idea of the structure required with the pertinent dimensions and the load section as determined by the calculations of your load requirements.



At this point a final check is wise to be certain that all of the required information is on the sketch. If you are positive that the proper dimensions and load sections are correctly shown the next step is to estimate the number of bundles of Bild-a-Flex needed for your structure. Bild-a-Flex is as near as your telephone if you don't carry a supply in your own storeroom. Just dial your local dealer or the nearest Republic warehouse for immediate delivery.

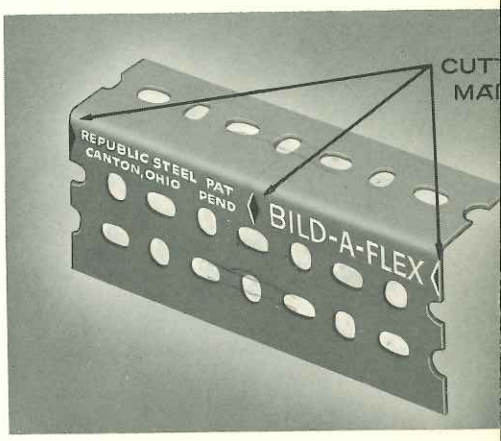
Cutting Bild-A-Flex

Next is the actual cutting of Bild-a-Flex and here the convenient 10 and 12 foot lengths assure you of the greatest possible economy. There can be no cutting scrap loss with Bild-a-Flex because even the smallest piece can be used as a cleat or foot rest. Clear, convenient cutting marks take the guess-work out of this operation and it can be handled easily by unskilled labor.



THE BILD-A-FLEX ANGLE CUTTER

The Bild-a-Flex construction angle can be cut with power saw, hacksaw, or by abrasive cut-off tools but the most accurate and efficient way of cutting it to proper length is with the Bild-a-Flex Angle Cutter. This cutter is designed to make the job a simple and quick one-man operation with economies in both time and material.



CUTTING MARKS

Bild-a-Flex is embossed with diamond-shaped cutting marks on three-inch centers to facilitate cutting and eliminate time consuming measurements. Just count off the proper number of marks and cut.

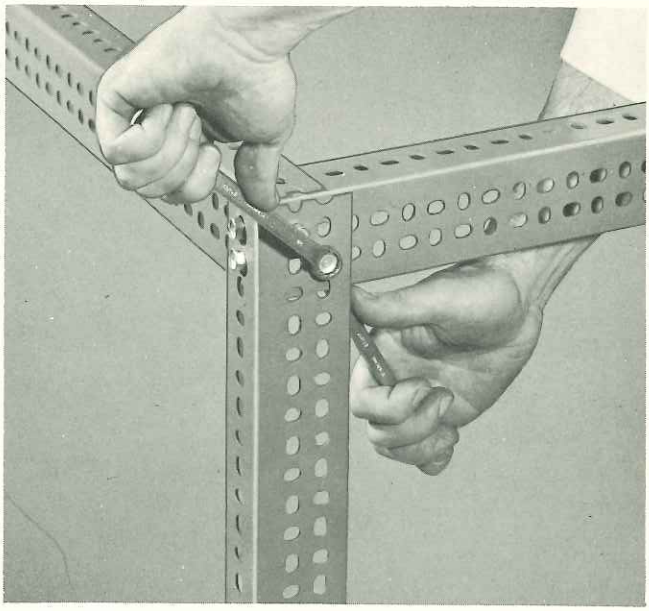
Plan each piece of your structure before cutting. Count off the proper number of marks and then place the Bild-a-Flex in the cutter and cut it. Keep the cut pieces together and remember there is no waste with Bild-a-Flex because the smaller pieces are ideal for cleats and braces.

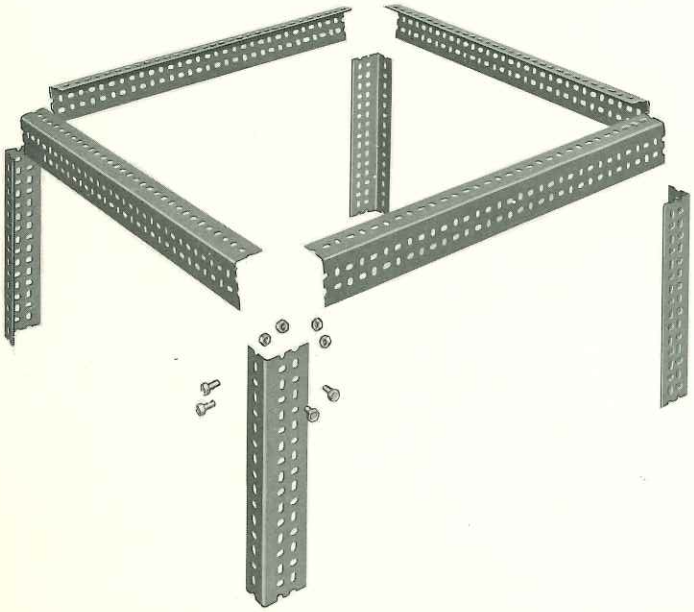
ANGLE CUTTING

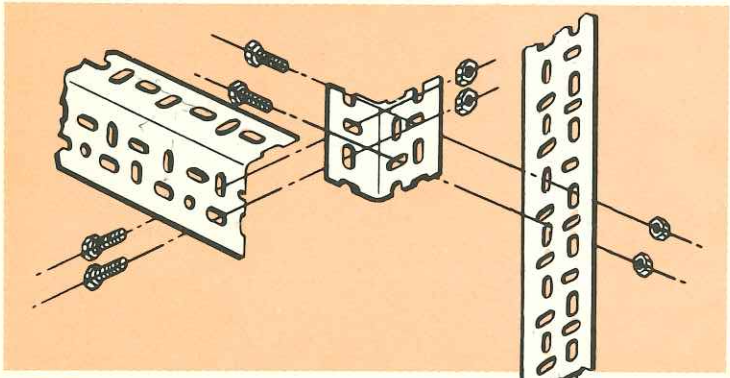
An angular joint presents no problem with a Bild-a-Flex Cutter. Simply insert the end to be cut on the diagonal into the front of the cutter at the desired angle and cut.

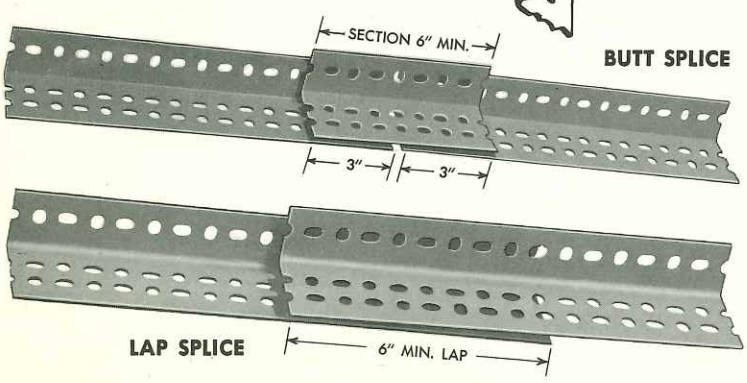
Joining Bild-A-Flex

The easiest operation of all is the final assembly. You know what you want to build and you have the materials to build it. Now all you have to do is join the pieces together. This requires just one or two standard wrenches, a square and a supply of Bild-a-Flex self-locking nuts. No special skills are needed.









Now that the cutting of Bild-a-Flex is accomplished you use your sketch as an assembly drawing and assemble the cut pieces as a series of frames. Using the first frame as a guide tie the assembly together with cross beams. Tighten all of the bolts finger tight. Square the entire assembly using your square. Tighten the corner bolts first, making certain that the corners stay square during the operation. Now tighten all bolts in the assembly and Bild-a-Flex is ready to go to work for you.

USE OF CLEATS

Cleats are small pieces of Bild-a-Flex used to reinforce certain types of joints.

The joint illustrated is a typical butt condition when a beam is joined to a column. Cleats are also used to reinforce joints when the application requires transverse stiffeners as illustrated on page 13.

REPUBLIC STEEL Bild-A-Flex

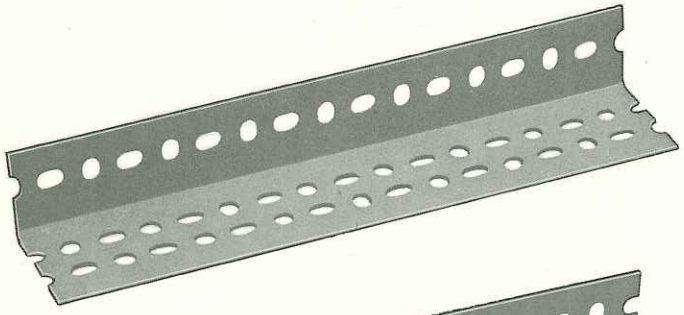


BILD-A-FLEX TYPE 1000

$2\frac{7}{16}$ inch by $1\frac{5}{8}$ inch construction angle fabricated from .080 gauge steel. Available in ten foot lengths it is packaged ten pieces to a bundle with 75 self-locking bolts and nuts.

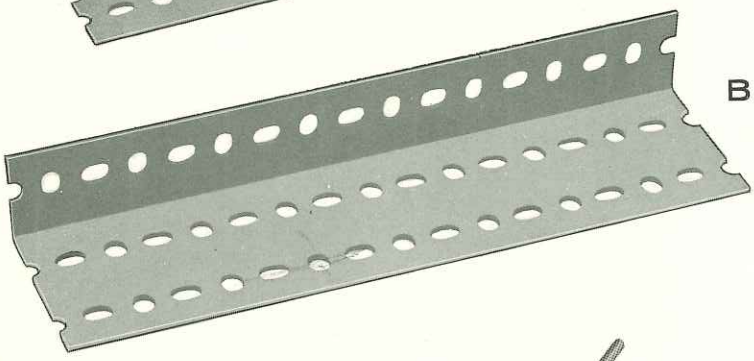
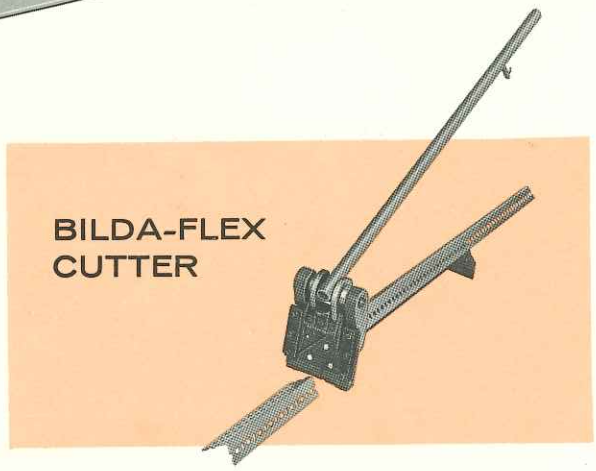


BILD-A-FLEX TYPE 1002

$2\frac{7}{16}$ inch by $1\frac{5}{8}$ inch construction angle fabricated from .080 gauge steel. Available in 12 foot lengths and packaged ten pieces to a bundle with 75 self-locking bolts and nuts.



Completely assembled ready for use. Available one to a carton.

BILD-A-FLEX TYPE 1001

$3\frac{1}{8}$ inch by $1\frac{5}{8}$ inch construction angle fabricated from .104 gauge steel. Available in ten foot lengths packaged ten pieces to a bundle with 75 self-locking nuts and bolts.

BILD-A-FLEX TYPE 1003

$3\frac{1}{8}$ inch by $1\frac{5}{8}$ inch construction angle fabricated from .104 gauge steel. Available in 12 foot lengths packaged ten pieces to a bundle with 75 self-locking nuts and bolts.

BILD-A-FLEX PANELS

Fabricated in six-inch widths and lengths from 36 inches to 60 inches in increments of six inches. Length and gauge required must be specified when ordering. Shipped 12 pieces to a package with 50 bolts.

BILD-A-FLEX SELF LOCKING BOLTS AND NUTS

Extra bolts and nuts are available in quantities of 75 of each to a package. It is recommended that you use $\frac{5}{16}$ x $\frac{5}{8}$" bolts for .080 and $\frac{5}{16}$ x $\frac{3}{4}$" bolts for .104 gauge Bild-a-Flex.

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